

Figure 1.

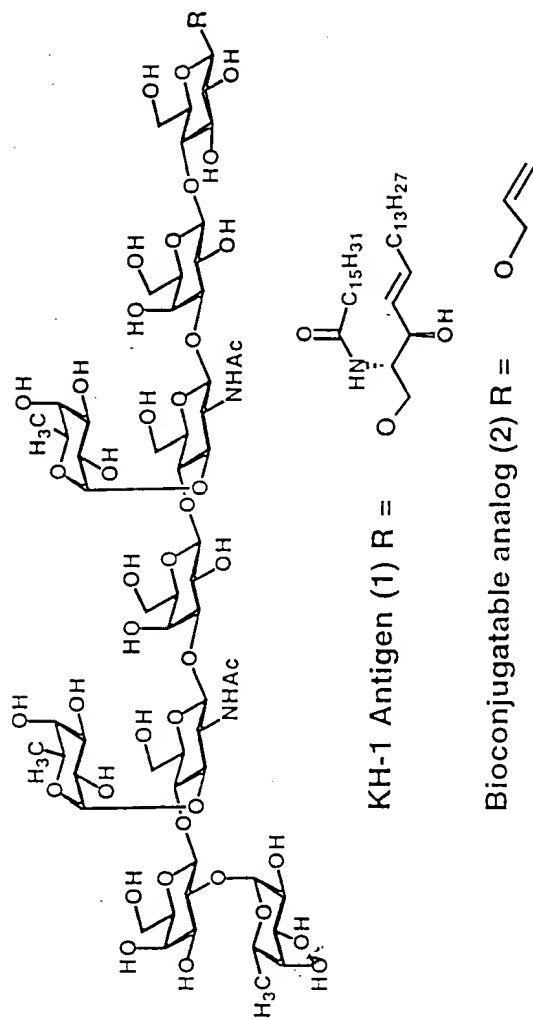
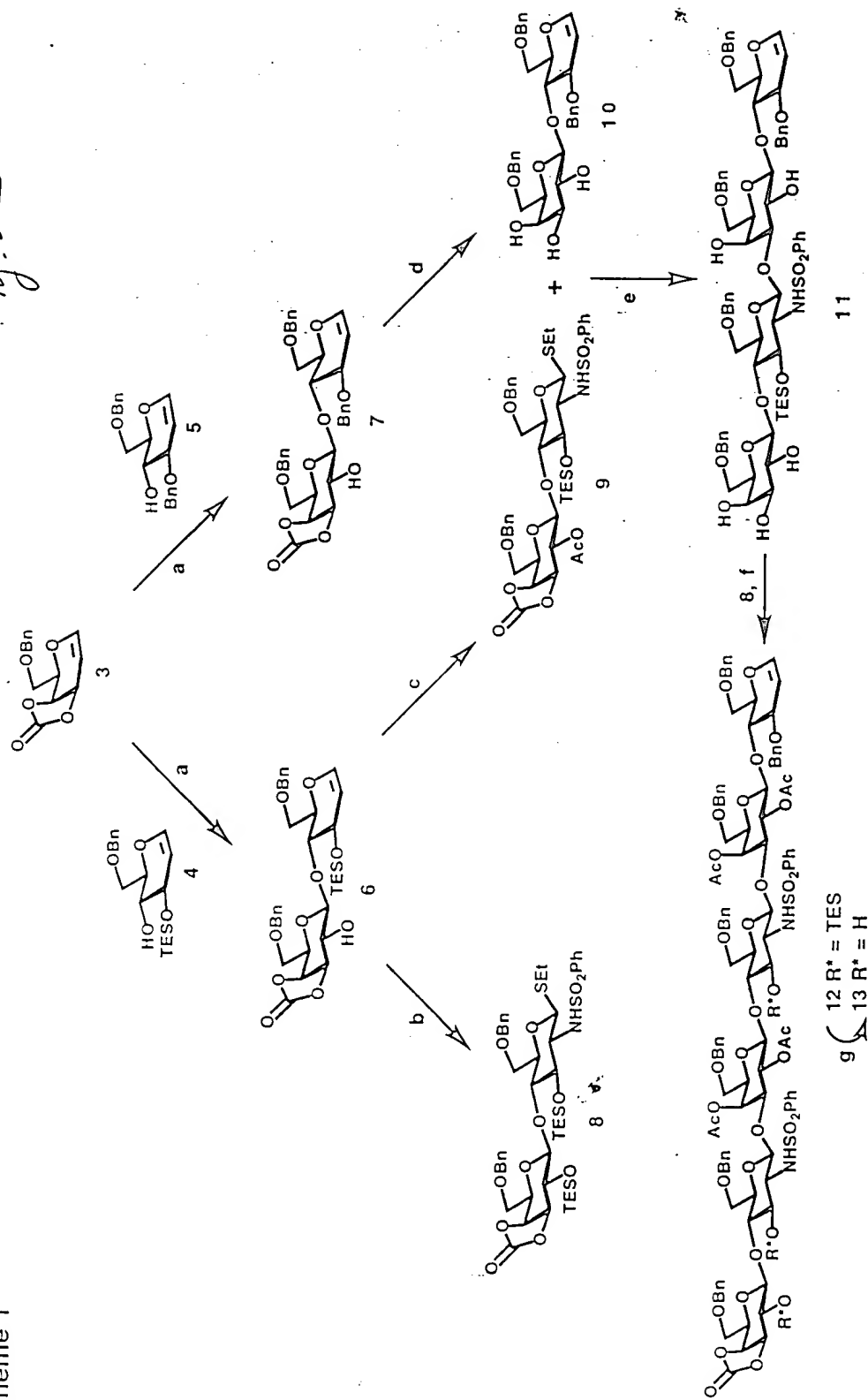


Fig. 2

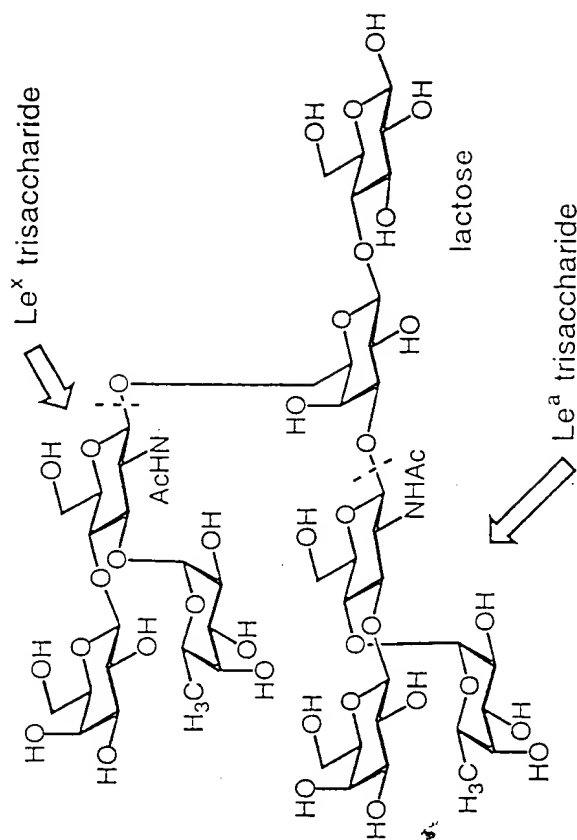
Scheme 1<sup>a</sup>



<sup>a</sup> Reagents: (a) (i) 3,3-dimethyldioxirane, CH<sub>2</sub>Cl<sub>2</sub>; (ii) 4 or 5, ZnCl<sub>2</sub>, THF 65% for 6 & 55% for 7; (b) (i) TESOTf, Et<sub>3</sub>N, CH<sub>2</sub>Cl<sub>2</sub>, 92%, (ii) I(coll)<sub>2</sub>ClO<sub>4</sub>, PhSO<sub>2</sub>NH<sub>2</sub>, 4 Å molecular sieves, CH<sub>2</sub>Cl<sub>2</sub>, > 90%; (iii) LHMDs, EtSH, DMF > 90% (c) (i) Ac<sub>2</sub>O, Et<sub>3</sub>N, DMAP, CH<sub>2</sub>Cl<sub>2</sub>, 95%; (ii) I(coll)<sub>2</sub>ClO<sub>4</sub>, PhSO<sub>2</sub>NH<sub>2</sub>, 4 Å molecular sieves, CH<sub>2</sub>Cl<sub>2</sub>, > 90%; (iii) LHMDs, EtSH, DMF (iv) Ac<sub>2</sub>O, Et<sub>3</sub>N, DMAP, CH<sub>2</sub>Cl<sub>2</sub>, 85%; (d) K<sub>2</sub>CO<sub>3</sub>, MeOH 80%; (e) (i) MeOTf, di-*t*-butylpyridine, Et<sub>2</sub>O:CH<sub>2</sub>Cl<sub>2</sub> (2:1), 4 Å MS (55%), (ii) K<sub>2</sub>CO<sub>3</sub>, MeOH (85%); (f) (i) MeOTf, di-*t*-butylpyridine, Et<sub>2</sub>O:CH<sub>2</sub>Cl<sub>2</sub> (2:1), 4 Å MS (60%); (ii) Ac<sub>2</sub>O, Py, DMAP, CH<sub>2</sub>Cl<sub>2</sub> (95%); (g) TBAF:AcOH (93%).

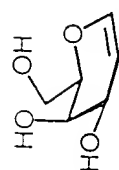


Fig. 4

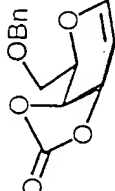
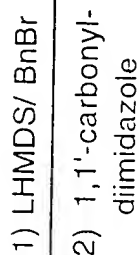


# Donor for Le<sup>x</sup> Part

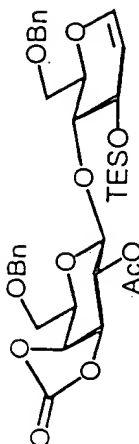
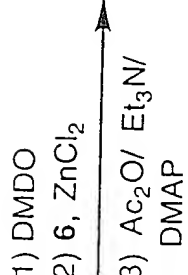
Fig. 5



1

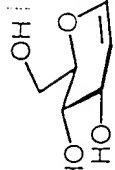


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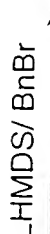


3

\* DMDO: dimethyldioxirane



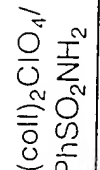
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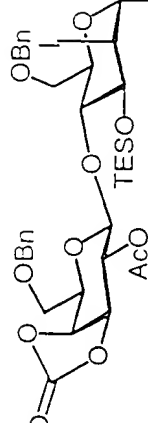
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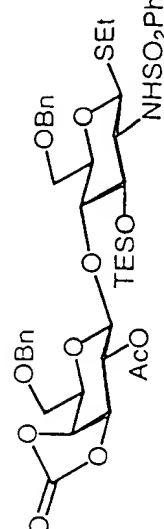
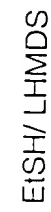
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3



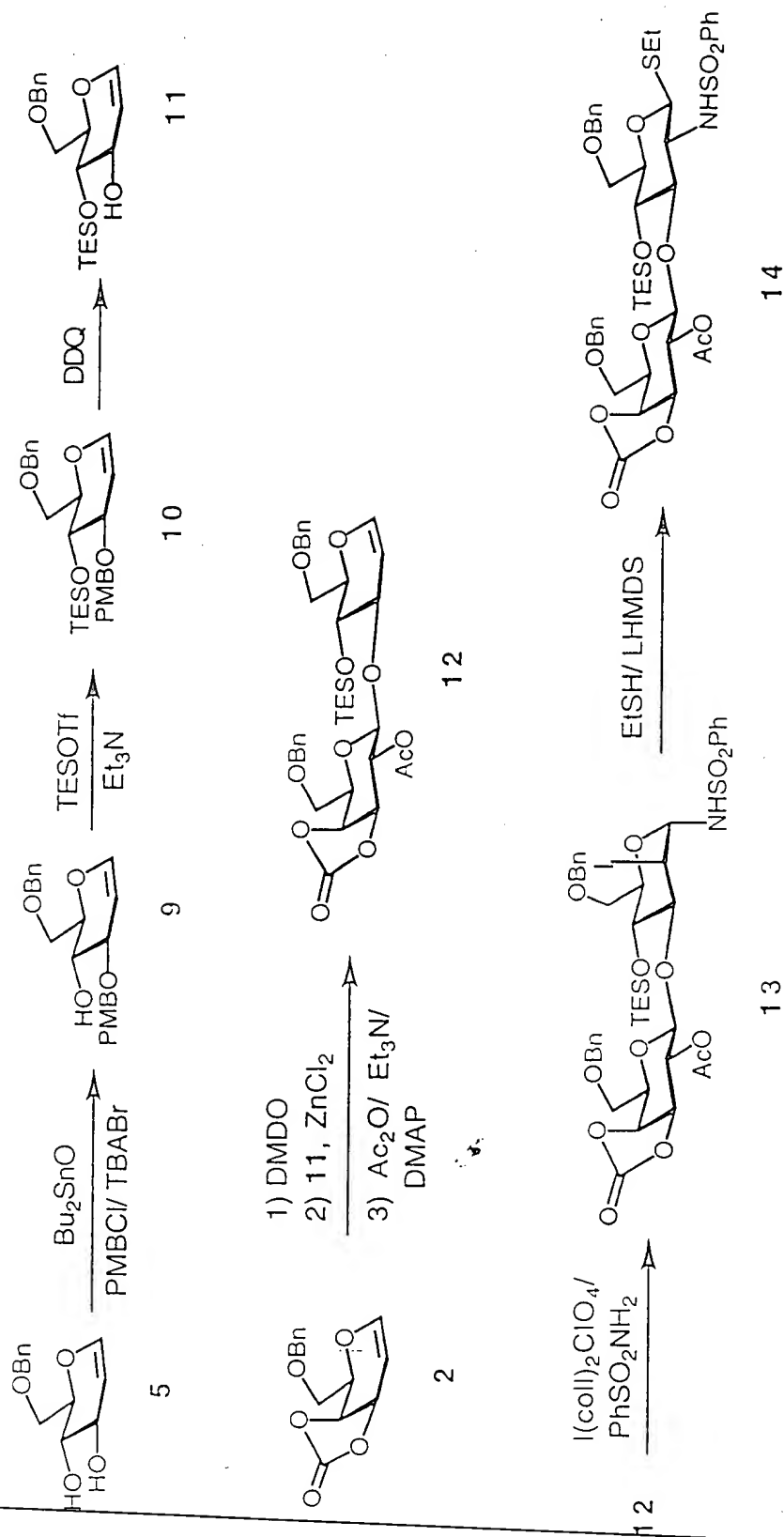
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8

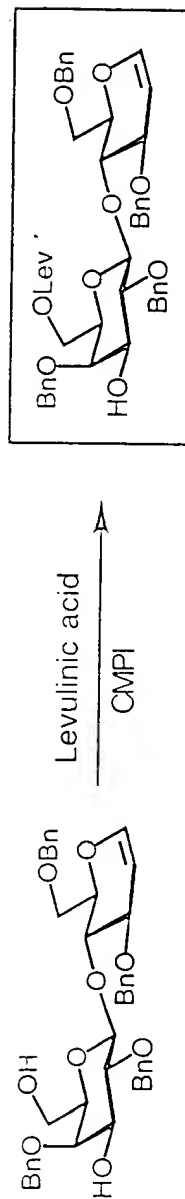
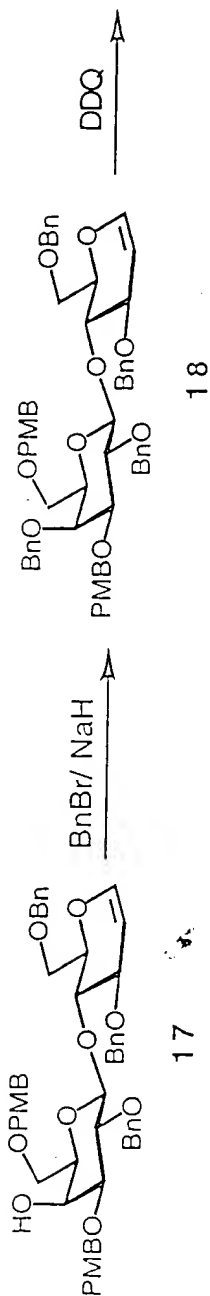
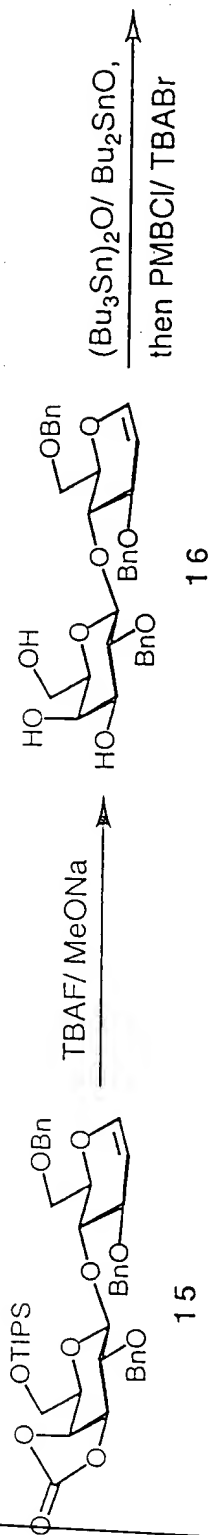
Fig. 6

# Donor for Le<sup>a</sup> Part



# Acceptor for N3 Antigens

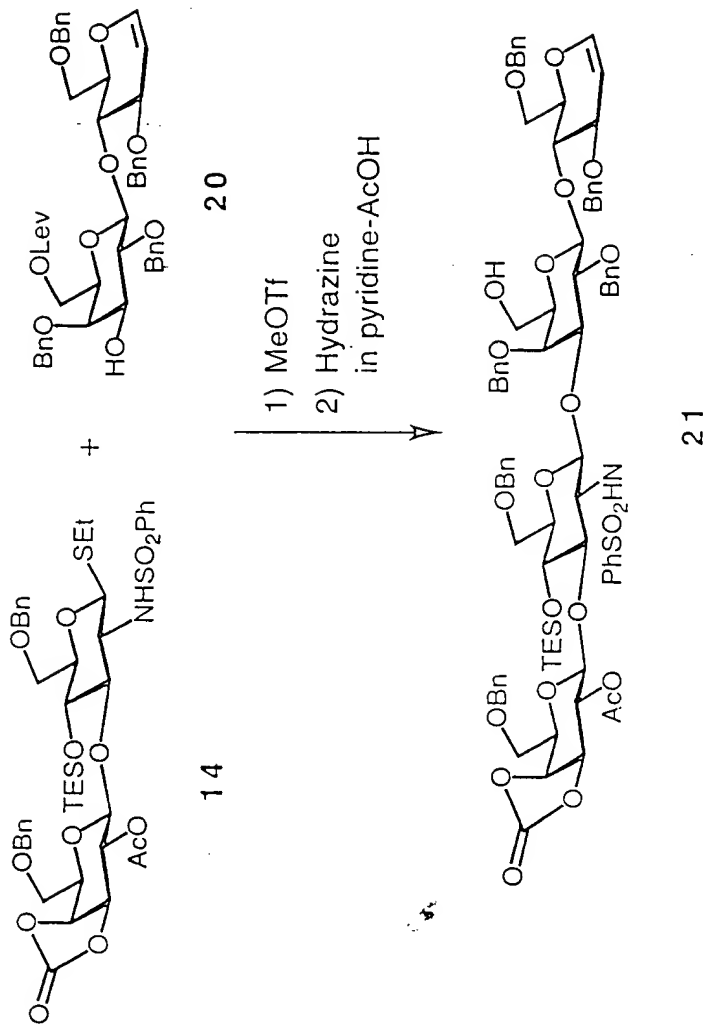
Fig 7



\*CMPI: 2-Chloromethyl  
pyridinium iodide

Fig. 8

## 2 + 2 Coupling for Major N3 Antigen





## 2 + 4 and +1,1 Coupling

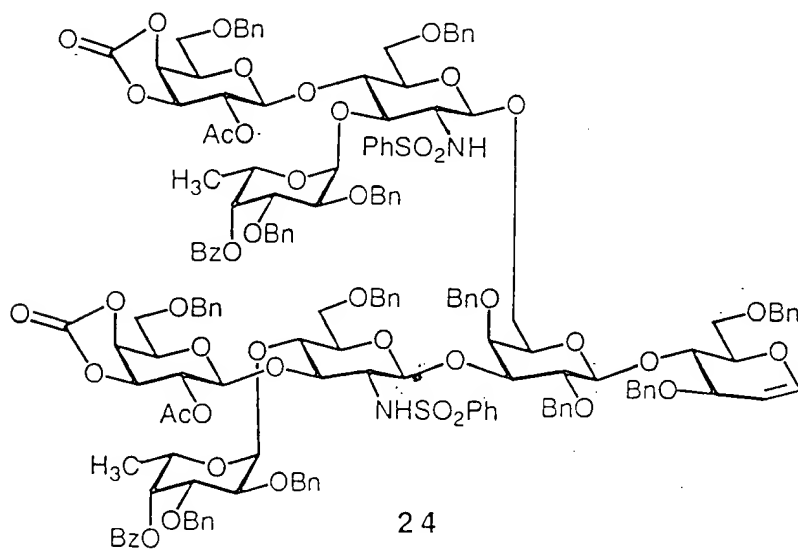
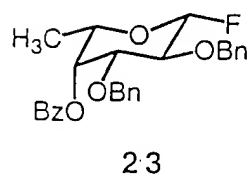
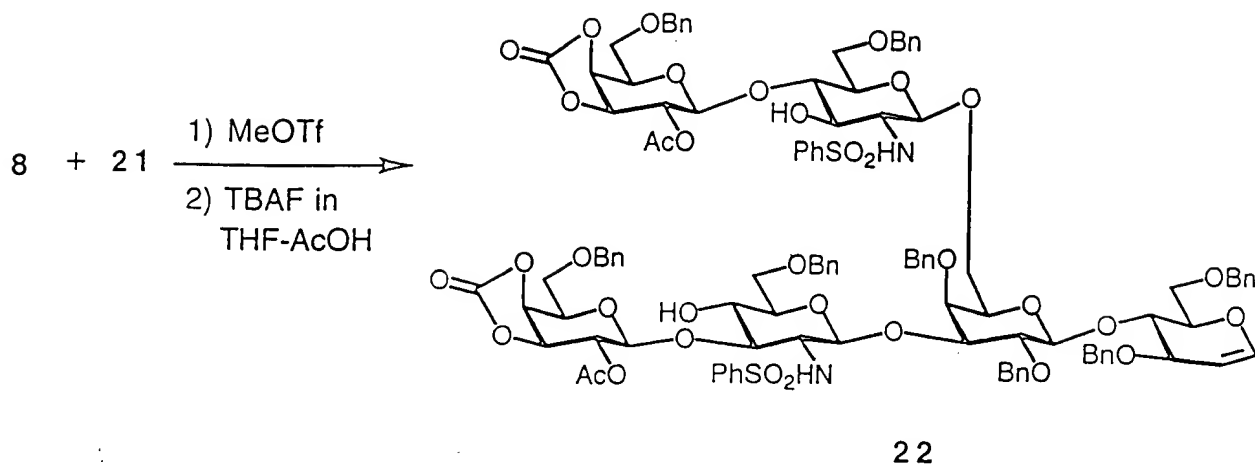
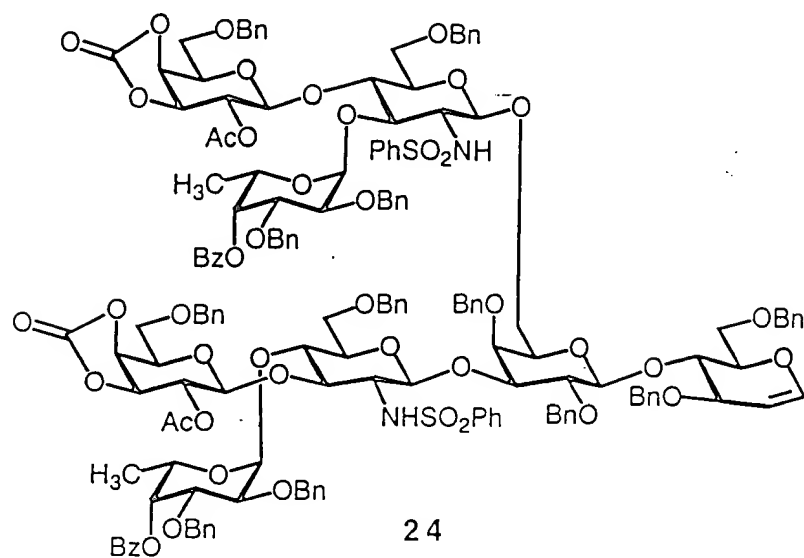


Fig 1

## Deprotection for *major-N3* Epitope



- 1) Na/ NH<sub>3</sub>, then  
Ac<sub>2</sub>O/ Et<sub>3</sub>N/ DMAP
- 2) DMDO, then allyl alcohol
- 3) NaOMe

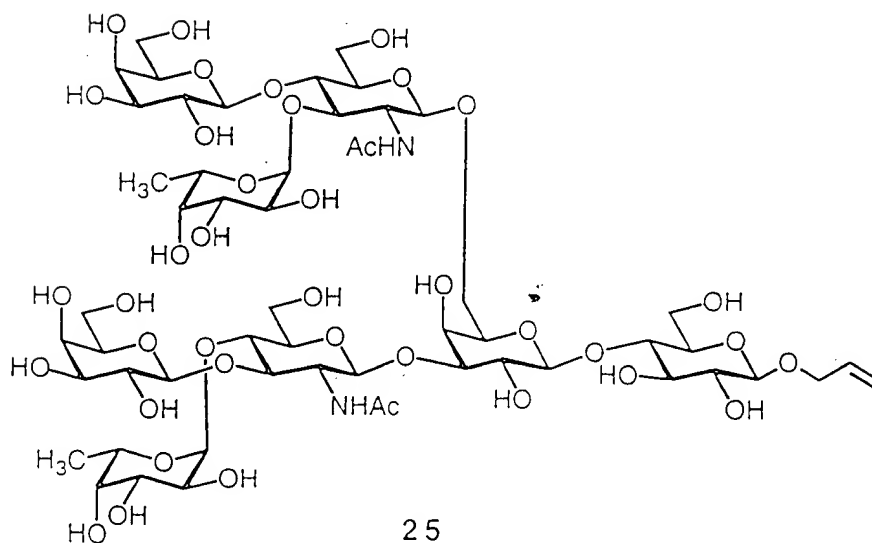


Fig. 10

# KH-1 Alternative Syntheses of tetra and hexasaccharide

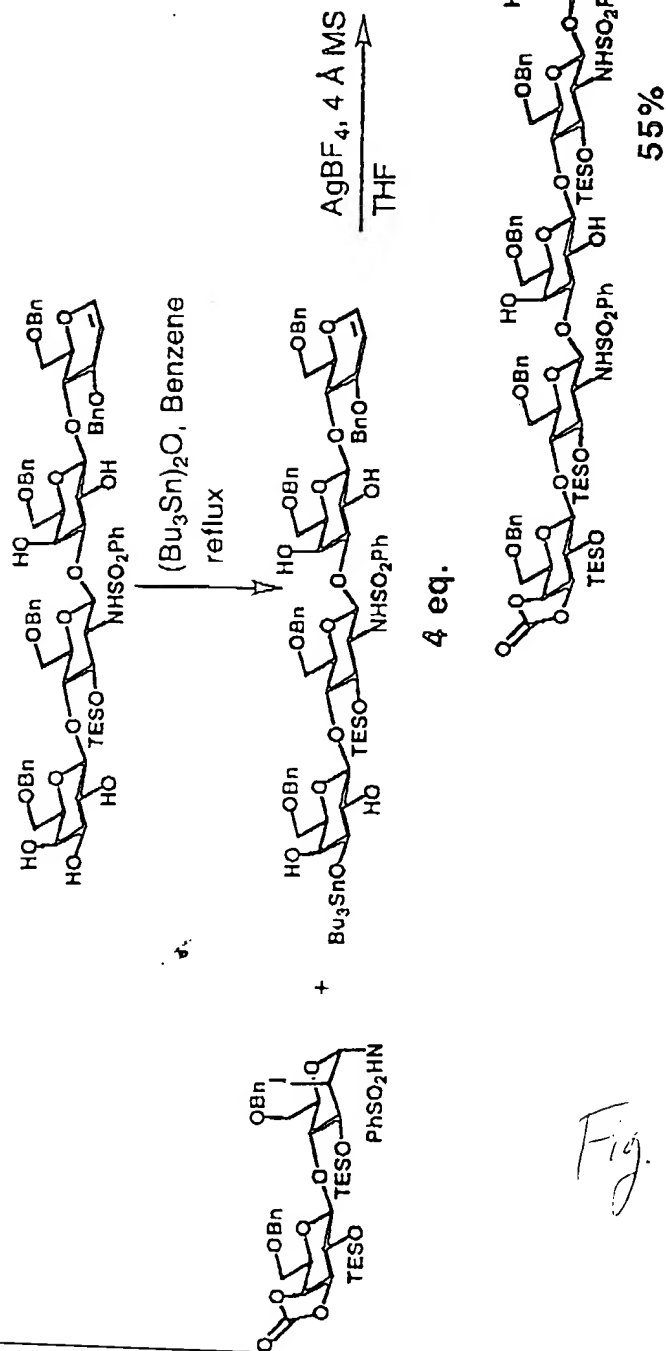
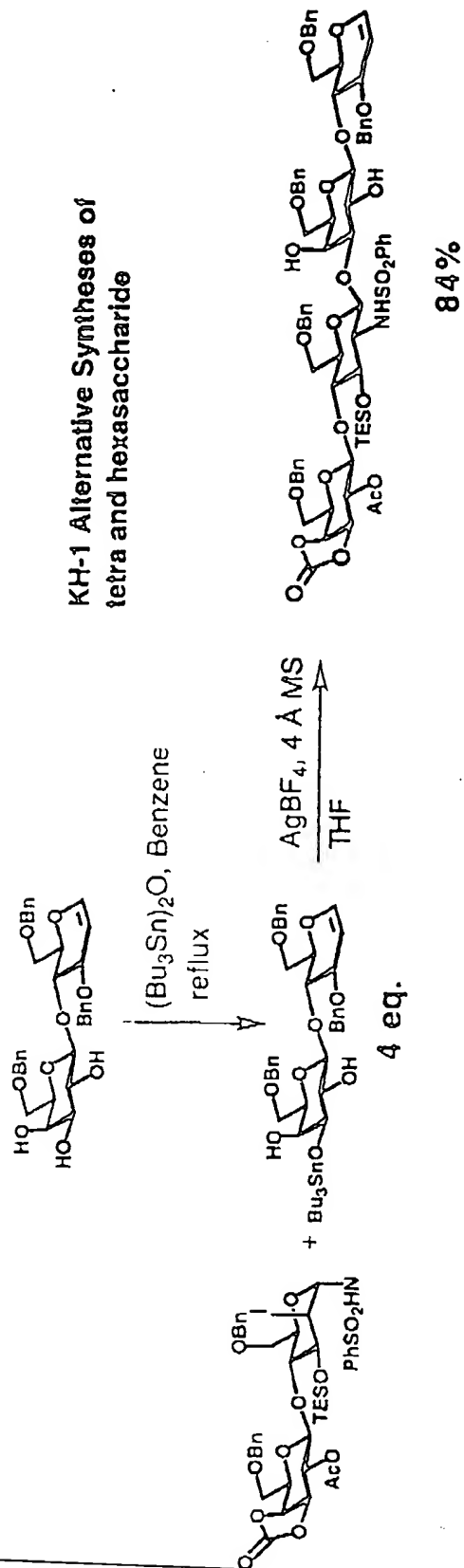
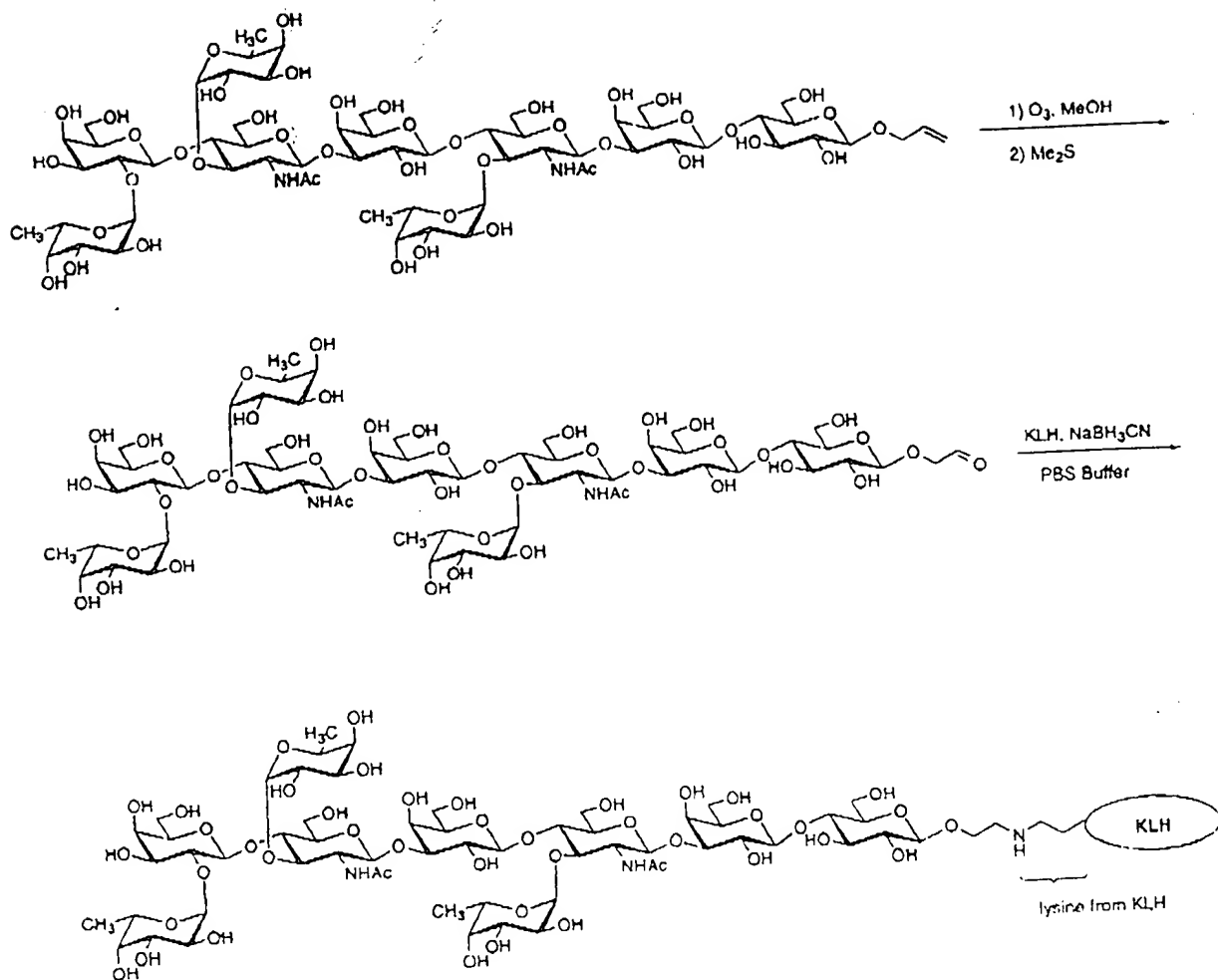
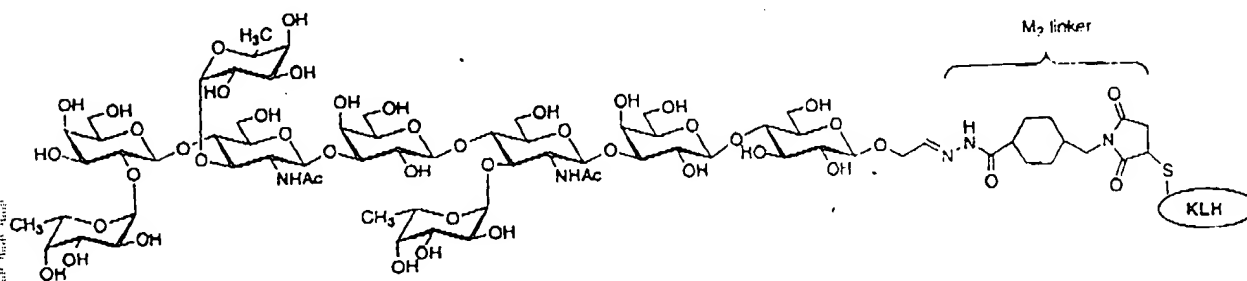
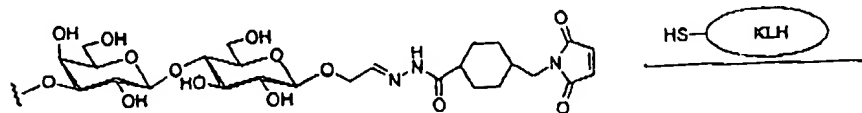
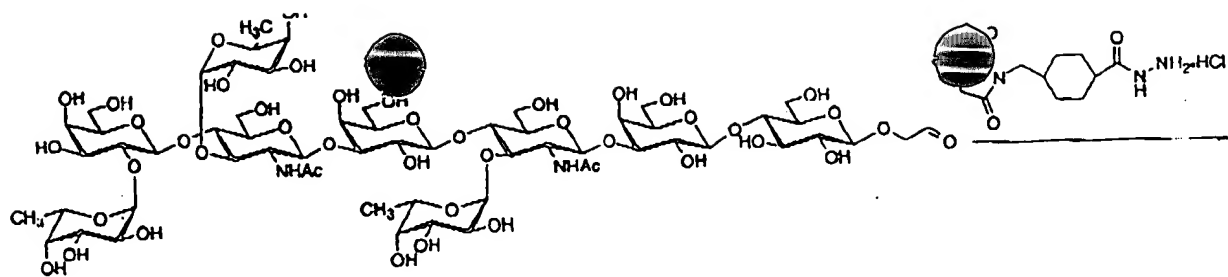


Fig. 11



Direct Coupling of KH-1 to KLH

Fig. 12



Cross linker coupling of KH-1 to KLH

Fig 13